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Cross-Border Acquisitions and Restructuring: Multinational Enterprises versus Private Equity- Firms

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Cross-border Acquisitions and Restructuring: Multinational Enterprises versus Private Equity-firms*

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ABSTRACT

An increasingly large share of cross-border acquisitions are undertaken by private equity-firms (PE-firms) and not by traditional multinational enterprises (MNEs). We propose a model of cross-border acquisitions in which MNEs and PE-firms compete over domestic assets. MNEs' advantage lies in firm-specific synergies and retained earnings, whereas PE-firms are good at reorganizing target firms. Prevailing interest rates do not work in favor of PE-firms, but a lower risk premium and a better financial market development does. Stronger firm-specific synergies, however, favors MNEs. Performing a welfare analysis, we show that a policy of restricting PE-firms from buying domestic assets can be counterproductive.

Keywords: Cross-border, International Restructuring, Ownership Efficiency, Private Equity, M&As.
JEL Codes: F23, F65, L13.

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1 Introduction

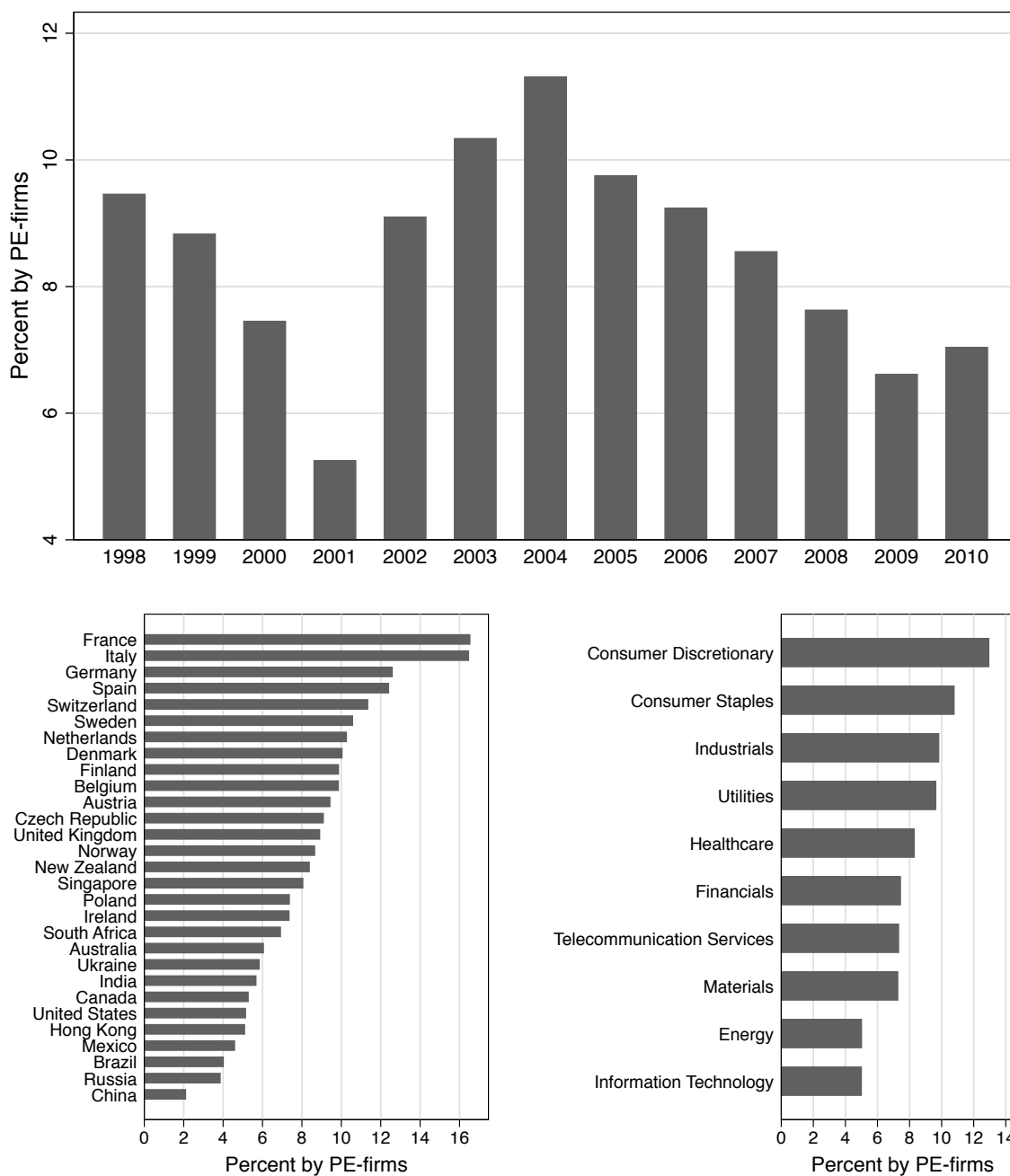
It is well established that cross-border acquisitions by multinational firms (MNEs) play a key role in the global industrial development and restructuring process. It is less known, however, that more than 8 percent of all cross-border acquisitions that took place during 1998-2010 were cross-border acquisitions undertaken by private equity firms (PE-firms). PE-firms are financial buyers of assets that acquire firms with the goal of restructuring and then reselling them. Data from the Capital IQ database displayed in Figure 1 shows that there is substantial variation over time, across countries, and across sectors in the share of cross-border acquisitions that are acquisitions by PE-firms as opposed to by MNEs.

Despite a burgeoning literature on cross-border acquisitions by MNEs, there is, to our knowledge, no work on the determinants and effects of cross-border acquisitions undertaken by PE-firms and their interaction with cross-border acquisitions undertaken by MNEs. What are potential determinants behind the variation we observe in Figure 1? And what are the welfare effects of acquisitions by PE-firms as opposed to MNEs?

To answer these questions, we develop a theory of cross-border acquisitions by MNEs and PE-firms. The starting point is that MNEs and PE-firms differ along three important dimensions. First, MNEs are "insiders" in an industry in the sense that they already have industry-specific knowledge and firm-specific assets in the global marketplace. These assets take the form of production facilities, intellectual property and retained earnings. Second, PE-firms are on the other hand "outsiders" that excel at reorganizing target firms to improve their productivity and profitability. As such, they do not have to rely on firm-specific assets to profit from acquisitions of target firms and they do not have to account for how their actions affect other potential asset holdings in the market. They are, however, required to rely to a greater extent on external investors to finance the acquisitions they undertake. Third, PE-firms are temporary owners of assets while MNEs are more permanent owners of assets. This implies that PE-firms are in need of clear exit strategies and face additional costs associated with reselling the target firms they acquire.

Using this distinction between MNEs and PE-firms, we propose the following model: initially there is a domestic product-market served by several foreign MNEs. There is also a domestic firm which is put up for sale. The domestic firm could be acquired either by one of the foreign MNEs or,

Figure 1: Percent of cross-border acquisitions that are undertaken by PE-firms



Notes. These figures display the percent of all cross-border acquisitions between 1998 and 2010 in the Capital IQ database that undertaken by PE-firms across time (top), country (bottom left), and sector (bottom right). We selected all "Mergers/Acquisitions" that had the feature "Cross-border" and "Acquisition of Majority Stake" and with transaction status "Closed" or "Effective". We then characterized the transaction as a transaction by a PE-firm if the transaction had the secondary feature of "LBO (Leveraged Buyout)". The figures display the percent of all cross-border transactions across time, country and industry for countries with more than 500 transactions in total.

alternatively, by one of several competing foreign PE-firms. Prior to bidding for the domestic firm, MNEs and PE-firms may seek financing from outside investors to finance the acquisition. Post-acquisition, product market competition takes place between the firms with assets in the market, repayments to outside investors are made, and finally—if a PE-firm acquired the target—the PE-firm resells the target firm.

We first establish that firm-specific synergies between MNE assets and the target firm assets are an important determinant of whether an MNE or a PE-firm ends up acquiring the target. Stronger synergies work in favor of the MNEs, that are then able to bid higher for the target firm than the PE-firms can. This suggests that variation across industries in how complementary assets are or how strong economies of scale are could be one important determinant of the the share of all cross-border transactions across industries that are acquisitions by PE-firms as opposed to acquisitions by MNEs.

We then show that acquisitions by PE-firms are more likely when financial market development in the target firm's country is higher. The reason is that this makes exits by PE-firms less costly. For example, in countries with developed financial markets there are more exit opportunities, and it is common that PE-firms exit their investments by listing the target firm on a stock exchange. Financial market development may thus be one important factor determining the share of all cross-border acquisitions across countries that are made by PE-firms.

In addition to synergies and financial market development, we also examine how general financial market conditions affect whether an MNE or a PE-firm acquires the target. We show that the overall interest rate in the economy does not affect who ends up as the owner in equilibrium. At first glance, this result is surprising since PE-firms lack retained earnings and must to a greater extent rely on financing from banks and investors. However, with well functioning capital markets, the cost of access to capital from outside investors to finance the acquisition also determines the opportunity cost of retained earnings for MNEs. When the interest rate goes down, making access to external financing more costly, the opportunity cost of using retained earnings for the acquisition also increases, implying that the foreign MNE firms remain indifferent to using retained earnings or external financing to finance the acquisition. Acquisition prices, though, do respond to changes in the interest rate as higher interest rates reduce the amounts that both MNEs and PE-firms are willing to pay to make the acquisition.

However, in contrast to the general interest rate, the risk premium associated with lending does affect the equilibrium ownership of the target. In effect, since MNEs can finance part of an acquisition with retained earnings instead of going to outside investors, MNEs have an advantage over PE-firms when the risk premium is high. This financial advantage decreases when the risk premium decreases. This suggests that we should observe fewer cross-border acquisitions by PE-firms relative to cross-border acquisitions by MNEs when economic conditions are worse and external financing for acquisitions is more costly.

Our model also allows us to explore the policy dimension. In the policy debate, there has been a concern that acquisitions by PE-firms—in particular by *foreign* PE-firms—are driven by short-run tax gains and asset stripping, resulting in job losses and long-run inefficiencies. For example, in 2005 Franz Muntefering of the ruling Social Democratic Party in Germany attacked foreign PE-firms making acquisitions in Germany by stating to the newspaper Bild that “They stay anonymous, have no face, fall upon companies like swarms of locusts, strip them bare and move on.”¹

Performing a welfare analysis on the effects of restricting foreign PE-firms from buying domestic target firms, we underscore that restricting PE-firms can be counterproductive since PE-firms may prevent a concentration of the market and may also—in instances when synergies between the MNEs’ assets and the target’s assets are low—increase productivity of the target’s assets more than MNEs do.

Our paper is a contribution to the theoretical literature on cross-border mergers and acquisitions in oligopolistic markets. This literature has, in contrast to the traditional foreign direct investment literature, emphasized that greenfield investments and cross-border acquisitions are not perfect substitutes.² There is also a small theoretical literature addressing welfare aspects of cross-border mergers in international oligopoly markets.³ Our contribution to these literatures is to build on Norbäck and Persson (2007, 2008) to incorporate foreign financial bidders in the form of PE-firms along the lines of Norbäck, Persson, and Tåg (2013). We are thus the first to propose an oligopoly

¹See also, for instance, “Testing the Model: Private Equity Faces a More Hostile World” (Jul 9 2009, *The Economist*), “Editorial, New Rules for Private Equity” (August 30 2009, *New York Times*) or “Private Equity Fights Tax Plan” (February 27 2009, *Financial Times*).

²See, for instance, Blonigen (1997), Bjorvatn (2004), Bertrand and Zitouna (2006), Fumagalli and Vasconcelos (2006) Head and Ries (2008), Mattoo, Olarreaga and Saggi (2004), Raff, Ryan and Stähler (2009) and Norbäck and Persson (2008)

³This literature includes papers by, for example, Falvey (1998), Head and Ries (1997), Horn and Persson (2001), Lommerud, Straume and Sorgard (2006), Neary (2007) and Norbäck and Persson (2007).

model of cross-border acquisitions where MNEs compete for domestic target firms with foreign PE-firms. We then use this model to derive predictions on when acquisitions by PE-firms as opposed to by MNEs are more likely and to study the welfare effects of restricting acquisitions by PE-firms.

The paper is also related to the literature on industrial reorganization in the finance literature which shows that M&A activity can be triggered by changes in owner productivity and the cost of new capital, where more productive owners buy assets from less productive ones.⁴ We add by showing that financial conditions may affect the types of mergers and how the efficiencies in these acquisitions are affected. There is also an emerging finance literature on the differences between strategic and financial buyers of assets in takeover auctions.⁵ This literature has not, however, focused on cross-border takeover auctions, oligopolistic product markets or welfare analyses.

The rest of the paper is organized as follows. The next section briefly discusses the differences between MNEs and PE-firms. In Section 3 we then set up a formal model of bidding competition between MNEs and PE-firms over domestic targets. In Section 4, we perform comparative statics to derive our main propositions regarding the effect of synergies, financial market development, and financial market conditions on whether an MNE or a PE-firm ends up buying the target. Section 5 discusses the welfare effects of banning cross-border acquisitions by PE-firms, Section 6 discusses extensions to the model, and we offer some concluding remarks in Section 7.

2 The Difference Between MNEs and PE-Firms

To better highlight the difference between MNEs and PE-firms, we start out with a brief primer of the business model of MNEs and PE-firms. MNEs are typically firms with firm-specific assets such as patents, know-how, and brand image that they exploit internationally. They are often large in size, organized as limited liability companies, and listed on a stock market. An MNE can expand internationally, either through greenfield investments (setting up a new plant) or by acquiring firms in host countries. The MNE model works as follows:

1. A group of entrepreneurs or managers with a business idea sets up a limited liability firm.

⁴See, for instance, Maksimovic and Phillips (2002)

⁵See, for example, Gorbenko and Malenko (2014), Martos-Vila, Rhodes-Kropf, and Harford (2013) and Hege, Lovo, Slovin, and Sushka (2012).

2. Due to proficient management and the creation of high-quality firm-specific assets such as patents and know-how, they grow and expand internationally.
3. The firm then exploits its firm and industry-specific assets and retained earnings internationally by exporting and/or undertaking foreign direct investment. It can also engage in greenfield investments or cross-border acquisitions at this stage.
4. This process then continues and shareholders benefit from increased stock market value and dividends.

In contrast, PE-firms are partnerships set up to acquire, restructure and resell firms with the help of money from institutional investors and from banks. This business model emerged in the 1980s in the United States but has since spread out worldwide.⁶ The private equity business model works as follows:

1. A group of entrepreneurs or managers with restructuring skills and an idea on how to improve the profitability of existing businesses set up a PE-firm and an associated PE-fund with a predetermined life span (usually around 10 years).
2. The partners in the PE-firm go out and raise capital from institutional investors such as pension funds and wealthy individuals.
3. After the target amount of capital for the PE-fund has been raised, the fund is closed and the PE-firm starts looking for firms to acquire, restructure, and then resell.
4. Once a firm has been identified, debt is raised to finance the acquisition. PE-firms usually acquire multiple firms in each fund, and each acquisition is financed with 60%-90% debt.
5. The target firm is acquired and restructured. Cash flows from the firm are used to pay off part of the debt.
6. After the firm has been restructured, the PE-firm resells the firm. The most common exit routes are listing the company on a stock exchange or selling it to another firm.

⁶See Kaplan and Strömberg (2009) or Tåg (2012) for surveys of the literature on PE-firms.

7. The returns from cash flows during the restructuring period and from the sale of the firms in the fund are split on a 80/20 basis with 80% going back to the investors in the PE-fund and 20% going to the PE-firm. The PE-firm also charges a management fee of 1%-2% of the capital committed to the fund.

This business model gives PE-firms several advantages over publicly listed MNEs in the restructuring process. First, concentrated ownership implies that agency costs are lower than in publicly listed firms and that the high leverage that PE-firms put on target firms puts pressure on managers to generate cash flow and not waste money on unprofitable investments (Jensen 1986; 1989). Second, PE-firms are temporary owners of the target firms and therefore have stronger incentives to both restructure target firms and take on debt to give management incentives to undertake restructuring activities (Norbäck, Persson and Tåg, 2013). Finally, PE-backed firms are not listed on a stock exchange and can therefore have an advantage over publicly traded firms due to less stringent reporting requirements. Publicly traded firms are subject to tighter bookkeeping, accounting and reporting standards which impose restrictions on the time and effort management spends on productivity enhancing exercises.

3 The Model

Throughout the paper, we will focus on three differences between MNEs and PE-firms that derive from the above two descriptions of how PE-firms and MNEs operate. First, MNEs are "insiders" in an industry in the sense that they already have industry-specific knowledge and firm-specific assets in the global marketplace. These assets take the form of production facilities, intellectual property and retained earnings. PE-firms lack such retained earnings, assets and industry-specific knowledge.

Second, PE-firms are on the other hand "outsiders" that excel at reorganizing target firms to improve their productivity and profitability.⁷ As such, they do not have to rely on firm-specific assets to profit from acquisitions of target firms and they do not have to account for how their actions affect other potential asset holdings in the market.

⁷See Davis, Haltiwanger, Handley, Lerner and Jarmin, Miranda (2014) for recent evidence on productivity improvements and Kaplan and Strömberg 2009 or Tåg(2010) for surveys of the literature.

Third, PE-firms are temporary owners of assets while MNEs are more permanent owners of assets. This implies that PE-firms are in need of a clear exit strategy and face additional costs associated with reselling the target firms they acquire.

In the remainder of this section, we build a model that incorporates these three differences between MNEs and PE-firms.

3.1 Setup

Consider an economy consisting of a domestic target firm, several foreign MNEs also operating in the domestic market and several foreign PE-firms. MNEs and PE-firms compete with each other to acquire the target firm, and they both need to obtain financing from external investors. The timing of the model is as follows:

1. *Financial contracting.* MNEs and PE-firms write contracts with external investors to obtain promises of financing in stage 2 in the case of winning the auction for the target firm. Repayments are made at the end of stage 3.
2. *The acquisition auction.* A domestic target firm is up for sale through a first price perfect information auction with externalities.⁸ Externalities mean that the value of winning for a bidder is determined *relative to* what happens if the bidder loses the auction. The bidders in this auction are the MNEs and the PE-firms. Depending on the valuations for winning the auction, either an MNE or a PE-firm obtains the target.
3. *Product market competition.* Firms that have assets for producing compete in the product market. If the target was acquired by a PE-firm, there are $n + 1$ firms on the market. Alternatively, if an MNE acquired the target, there are only n firms competing on the market. If the PE-firm acquired the target in stage 2, it will need to resell the target firm (to, say, an independent outside investor). After product market actions have been set and profits have been realized, repayments to outside investors are made, eventual costs of reselling the assets are incurred and the game ends.

We solve the game by backward induction starting with the product market competition stage.

⁸For an example of this type of auction, see Jehiel and Moldovanu (1999) or Norbäck, Persson and Tåg (2013).

3.2 Stage 3: Product Market Competition

The set of potentially producing firms in the industry is $\mathcal{J} = \{i_1, i_2, \dots, i_n, p_1, p_2, \dots, p_m\}$, where $j \in \mathcal{J}$ is an element. The first n entries refer to the n number of MNEs (i) and the final m entries to the m number of PE-firms (p). The set of (potential) owners of the target firm's assets is $\mathcal{L} = \mathcal{J}$, where $l \in \mathcal{L}$ is an element. Let $\pi_j(\mathbf{x}, l)$ denote the product market profit of firm j . The vector of actions taken by firms in product market interaction is x . Only firms that have assets for producing compete in the product market. Hence, if the target was acquired by a PE-firm then there are $n+1$ firms on the market, whereas if an MNE acquired the target, there are n firms on the market.

Given l , firm j chooses an action x_j to maximize its product market profits anticipating the repayments to outside investors:

$$\pi_j(x_j, x_{-j} : l) - R_l - E_l - F_l. \quad (1)$$

In this expression, x_{-j} is the set of actions taken by j 's rivals, R_l refers to payments made to outside investors and E_l are exit costs incurred by PE-firms such that $E_i = 0$ and $E_p = E$ if firm $j = l$ is the acquirer. Fixed restructuring costs are F_l and are only relevant if the target is acquired ($F_l > 0$ if $l = j$ and $F_l = 0$ for $l \neq j$).

Assume that a unique Nash-Equilibrium $\mathbf{x}^*(l) = (x_j^*(l), x_{-j}^*(l))$ exists, and is defined as

$$\pi_j(x_j^*, x_{-j}^* : l) - R_l - E_l - F_l \geq \pi_j(x_j, x_{-j}^* : l) - R_l - E_l - F_l, \quad \forall x_j \in R^+. \quad (2)$$

Since product market actions do not affect repayments of what was previously borrowed and fixed restructuring costs do not affect product market actions, we can define a reduced-form product market profit for a firm j , taking as given the ownership l of the target firm's assets, as $\pi_j(l) \equiv \pi_j(x_j^*(l), x_{-j}^*(l), l)$. Thus, we have that $\pi_A(i)$ is the profit for an MNE ($l = i$) and $\pi_P(p)$ is the profit for a PE-firm ($l = p$) in the case when an acquisition takes place. Non-acquiring MNEs' profits are $\pi_{NA}(l)$, where $l = \{p, i\}$ is the type of owner of the target firm. Non-acquiring PE-firms do not have assets in the market and thus have zero profits.

The potential owners of the target firm differ in terms of how efficient they are at utilizing its assets; this is denoted by an ownership efficiency parameter $\gamma \in [0, \gamma^{\max}]$ for $\gamma^{\max} > 1$. This

parameter captures synergies between the assets of the MNE and the target and it captures the extent to which PE-firms are able to restructure the target firm to improve profitability. We allow the ownership efficiency parameter to vary between MNEs and PE-firms, but normalize it to unity for PE-firms. Hence, $\gamma > 1$ says that a MNE firm would be able to make better use of the target's assets than a PE-firm, whereas if $\gamma < 1$ then an MNE is less efficient than a PE-firm at running the target.

The ownership efficiency parameter will affect the profits of MNEs and rival MNEs in the following way:

Assumption 1 $\frac{d\pi_A(i)}{d\gamma} > 0$ and $\frac{d\pi_{NA}(i)}{d\gamma} < 0$.

Assumption 1 is compatible with oligopoly models of competition (see for example Farrell and Shapiro, 1990) including the Cournot model where γ reduces the marginal costs for the acquirer.⁹

3.3 Stage 2: Acquisition Auction

In this stage, we determine the ownership and the acquisition price of the target's assets. The acquisition process is depicted as an auction where all MNEs and PE-firms simultaneously post bids. Everyone announces a bid, b_i , which is either accepted or rejected by the target's owner. Following the announcement of bids, the target's assets are sold at the highest bid price. The acquisition is solved for Nash equilibria in undominated pure strategies. We allow MNEs with retained earnings A to access financial markets to earn interest rate r between stages 2 and 3, if they do not use the retained earnings to (partly) pay for the target's assets. In stage 1, each MNE and PE-firm is offered a borrowing contract specifying a repayment $R_l^*(I_l)$ in period 3 when borrowing an amount I_l .

To solve the acquisition auction and determine bids, we need to determine the valuations of the bidders for obtaining the assets. To aid in this, we introduce the net gain function $N_l(S)$ which defines the net gain for a bidder of type l if the acquisition price is S and that the acquirer only borrows the minimum amount needed to be able to pay the acquisition price defined as $I_l^{\min}(S, A)$.

⁹Take the Linear Quadratic Cournot Model as an example. Let demand be linear, $P = a - \frac{Q}{s}$, where a indicates consumer willingness to pay and s denotes market size. Direct product market profits are $\Pi_h = (P - c_h)q_h$, where q_h is output for a firm of type $h = \{A, NA\}$. The marginal cost of an acquirer is $c_A = c - \gamma k$ and the non-acquirer has the marginal cost $c_{NA} = c$. k captures the quality of the initial assets. Reduced-form profits then take the form $\pi_h(l) = \frac{1}{s} (q_h^*)^2$, where $q_A^*(i) = \frac{a-c+n\gamma k}{n+1}$ and $q_{NA}^*(i) = \frac{a-c-\gamma k}{n+1}$. Hence, $\frac{d\pi_A(i)}{d\gamma} > 0$ and $\frac{d\pi_{NA}(i)}{d\gamma} < 0$.

As noted above, the MNE will face a fixed restructuring cost of F_i when restructuring the target firm.

An MNE will have two net gain functions defined as

$$N_{il}(S) = \underbrace{[\pi_A(i) - S] + [I_i^{\min}(S, A) - R_i^*(I_i^{\min}(S, A))]}_{\text{Acquire}} + A - F_i - \underbrace{[\pi_{NA}(l) + (1+r)A]}_{\text{Do not acquire}}, \quad (3)$$

for $l \in \{i, p\}$. The first term consists of product market profits net of the acquisition price ($\pi_A(i) - S$). The second term consists of the interest payments on borrowed funds, i.e. the amount borrowed net the amount repaid ($I_i^{\min}(S, A) - R_i^*(I_i^{\min}(S, A))$). The third term is the retained earnings (A) and the fourth term is the fixed restructuring costs ($-F_i$). The fifth term is the product market profits in the case where the MNE does not acquire the target and is forced to compete either with an MNE that acquires the assets ($-\pi_{NA}(i)$) or a target acquired by a PE-firm ($-\pi_{NA}(p)$). Note that an MNE's maximum willingness to pay for the target depends on what happens if another MNE obtains the target ($l = i$) or if a PE-firm obtains the target ($l = p$) in a different way since the two types differ in synergies γ . The final term, $-(1+r)A$, is the value of the retained earnings in the case where the MNE does not acquire the target.

The maximum willingness to pay, v_{il} , can be determined as $v_{il} = \min S, s.t. N_{il}(S) \geq 0$. Solving for $N_{il}(S) = 0$, we get the maximum willingness to pay for each of the two net gain functions as

$$v_{il} = \pi_A(i) - F_i - \underbrace{[R_i^*(I_i^{\min}(v_{il}, A)) - I_i^{\min}(v_{il}, A)]}_{\text{Cost of borrowing}} - \pi_{NA}(l) - \underbrace{rA}_{\text{Opportunity cost of retained earnings}} \quad (4)$$

Using the same argument, we see that the net gain for a PE-firm of acquiring the assets equals

$$N_p(S) = \underbrace{[\pi_p(p) - E] - S - [R_p^*(I_p^{\min}(S)) - I_p^{\min}(S)] - F_p}_{\text{Acquire}} - \underbrace{0}_{\text{Do not acquire}}, \quad (5)$$

which gives a maximum willingness to pay equal to

$$v_p = \pi_P(p) - F_p - E - \underbrace{[R_p^*(I_p^{\min}(v_p)) - I_p^{\min}(v_p)]}_{\text{Cost of borrowing}}. \quad (6)$$

Given the valuations v_{il} and v_p , defined in equations (4) and (6), we can now solve the auction for

the target's assets and determine equilibrium ownership and the acquisition price. These valuations can be ranked in six ways and the auction solved by considering each ranking in turn.

Lemma 1 *The equilibrium ownership of the target and the acquisition price S^* in stage 1 are given in Table 1.*

Table 1: Equilibrium Ownership

Inequality	Definition	Winning type	Acquisition price, S^* .
$I1$	$v_{ii} > v_{ip} > v_p$	i	v_{ii}
$I2$	$v_{ii} > v_p > v_{ip}$	i (or p)	v_{ii} (or v_p)
$I3$	$v_{ip} > v_{ii} > v_p$	i	v_{ii}
$I4$	$v_{ip} > v_p > v_{ii}$	i	v_p
$I5$	$v_p > v_{ii} > v_{ip}$	p	v_p
$I6$	$v_p > v_{ip} > v_{ii}$	p	v_p

Proof. See the Appendix. ■

For $I1 - I3$, a *preemptive* MNE acquisition takes place. MNEs bid against each other in the fear of being forced to compete with an MNE that acquired the target and obtained efficiency gains from synergies, γ . The acquisition price is bid all the way up to $S^* = v_{ii}$. For $I2$, there can potentially be two equilibria. In the first, MNEs do not expect other MNEs to outbid the PE-firms so that a PE-firm wins the auction. In the second, MNEs expect other MNEs to bid for the target and that a preemptive acquisition takes place. For simplicity, we will focus on the second equilibrium (a preemptive acquisition occurs). For $I4$, a *concentrating* MNE acquisition takes place at price $S^* = v_p$. One MNE finds it profitable to bid slightly above the PE-firms in order to reduce the number of firms on the market from $n + 1$ to n . For $I5 - I6$, a PE-firm acquires the assets since a PE-firm's valuation exceeds an MNEs' valuations. Finally, note that the equilibrium borrowing $I_l^*(S^*, A)$ and repayment $R_l^*(I_l^*(S^*, A))$ are determined by S^* .

3.4 Stage 1: Financial Contracting

In this stage, each MNE and PE-firm is offered a borrowing contract specifying a repayment $R_l(I_l)$ in stage 3 when borrowing an amount I_l in stage 2 if acquiring the target firm, up to the maximum amount $R_l^{\max}(I_l^{\max})$. Note that funding is conditional on making an acquisition, and

we assume perfect information and bidding competitions among symmetric investors, implying that all investors break even. Consequently, each MNE and PE-firm is promised a borrowing contract in equilibrium.

Since acquiring firms are typically associated with an idiosyncratic risk, the investor will require a risk premium, labeled ρ , to lend money to the acquirer. This risk will, however, not be present in the deposit (lending) rate r , which is not subject to this kind of risk.¹⁰

Given perfect financial markets, it follows that investors will require an interest rate of $r + \rho$ to lend in equilibrium. At a lower interest rate, the investor will prefer putting its money in the risk free investment to get r . And perfect financial markets mean that there are always investors willing to lend to the MNEs and the PE-firms at $r + \rho$. This implies that the equilibrium repayment will be $R_l^* = (1 + r + \rho)I_l$.

We can now state the following lemma.

Lemma 2 *In the borrowing equilibrium, we have that:*

(i) *A PE-firm will get a loan guarantee of $I_p^{*\max} = (1 + r + \rho)^{-1}(\pi_P(p) - F_p - E)$ with an associated repayment of $R_p^{*\max} = \pi_P(p) - F_p - E$.*

(ii) *An MNE will get a loan guarantee of $I_i^{*\max} = (1 + r + \rho)^{-1}(\pi_A(i) - F_i)$ with an associated repayment of $R_p^{*\max} = \pi_A(i) - F_i$.*

This lemma pins down the maximum amount that MNEs and PE-firms can borrow to finance the acquisition in stage 2. The proof goes as follows. For PE-firms, we know that the maximum payoff in stage three is $\pi_P(p) - F_p - E$. Thus, $R_p^{*\max} = \pi_P(p) - F_p - E$ and $I_p^{*\max} = (1 + r + \rho)^{-1}(\pi_P(p) - F_p - E)$. For an MNE, we know that its maximum repayment in stage three is $\pi_A(i) - F_i$. Thus, $R_i^{*\max} = \pi_A(i) - F_i$ and $I_i^{*\max} = (1 + r + \rho)^{-1}(\pi_A(i) - F_i)$.

¹⁰The risk premium will account for a comprehensive credit risk that includes but is not limited to the risk of loan restructuring, moratorium, and other changes in the payment plan which are more common among PE-firms than the MNE. Additionally, ρ could reflect additional expectations of returns investors in PE-funds would require to compensate for liquidity risks. Thus, it would make sense to introduce differences in the credit risk of both types of borrowers. However, to simplify this, we here assume it to be the same for MNEs and PE-firms. We relax this assumption in Section 6.

4 Equilibrium Ownership: MNEs versus PE-Firms

Having set up a model of bidding competitions between MNE firms and PE-firms, let us now turn to comparative statics on the determinants of when an MNE will acquire the target and when the target will be bought by a PE-firm. We focus on three aspects: firm-specific synergies (γ), financial market conditions (interest rates, r and ρ) and financial market development (exit costs, E).

4.1 Firm-Specific Synergies

We start with how equilibrium ownership depends on firm-specific synergies, γ . To this end, we need to derive the maximum willingness to pay, v_{il} and v_p , given optimal behavior in the financial market. We can use that $R_i^* = (1 + r + \rho)I_i$ and $I^{\min} = S - A$ in equation (3) to obtain

$$N_{il}(S) = \underbrace{[\pi_A(i) - F_i - S] + [(S - A) - (1 + r + \rho)(S - A)] + A}_{\text{Acquire}} - \underbrace{[\pi_{NA}(l) + (1 + r)A]}_{\text{Do not acquire}} = 0, \quad (7)$$

for $l \in \{i, p\}$. Solving for $N_{il}(S) = 0$, we get the maximum willingness to pay for each of the two net gain functions:

$$v_{il} = [1 + r + \rho]^{-1}[\pi_A(i) - F_i - \pi_{NA}(l) + \rho A]. \quad (8)$$

Then, we use that $R_i^* = (1 + r + \rho)I_l$ and $I^{\min} = S$ in equation (5) to obtain

$$N_p(S) = \underbrace{[\pi_p(p) - E] - S - [(1 + r + \rho)S - S] - F_p}_{\text{Acquire}} - \underbrace{0}_{\text{Do not acquire}}. \quad (9)$$

Solving for $N_p(S) = 0$, we get:

$$v_p = [1 + r + \rho]^{-1}[\pi_p(p) - F_p - E]. \quad (10)$$

Having obtained the valuations v_{ii} , v_{ip} and v_p , we can now turn to examining how synergies γ affect who will acquire the target firm.

The valuations of MNEs, v_{ip} and v_{ii} , increase monotonically in γ , whereas the PE-firm valuation v_p is independent of γ . Thus, we can state the following Lemma.

Lemma 3 *There exists a unique γ^{PE} defined from $v_{ip}(\gamma^{PE}, \cdot) = v_p$ and a unique γ^{PRE} defined from $v_{ii}(\gamma^{PRE}, \cdot) = v_p$.*

To explain and illustrate our results, we will make use of the following assumption which, for instance, holds in the LQC model.

Assumption 2 $\gamma^{PRE} > \gamma^{PE} > 0$.

This assumption allows us to derive a simple graphical solution where all types of relevant equilibria are present. In Figures 2(i) and 2(ii), we derive equilibrium ownership for which the size of synergies γ varies. We can state the following proposition.

Proposition 1 *Equilibrium ownership depends on firm-specific synergies, γ , as follows:*

- (i) *A PE-firm will acquire the target at price $S^* = v_p$ if $\gamma \in (0, \gamma^{PE})$.*
- (ii) *An MNE concentrating acquisition will take place at price $S^* = v_p$ if $\gamma \in [\gamma^{PE}, \gamma^{PRE})$.*
- (iii) *An MNE preemptive acquisition will take place at price $S^* = v_{ii}$ if $\gamma \geq \gamma^{PRE}$.*

To see the intuition behind this proposition, start with considering Figure 2. The top part of the figure illustrates the net value for an MNE of deterring a PE-firm from acquiring the target ($v_{ip} - v_p$) and the net value for an MNE of deterring another MNE from acquiring the target ($v_{ii} - v_p$). These functions are given by

$$v_{ip} - v_p = [1 + r + \rho]^{-1}[\pi_A(i) - F_i - \pi_{NA}(p) + \rho A - \pi_p(p) + F_p + E], \text{ and} \quad (11)$$

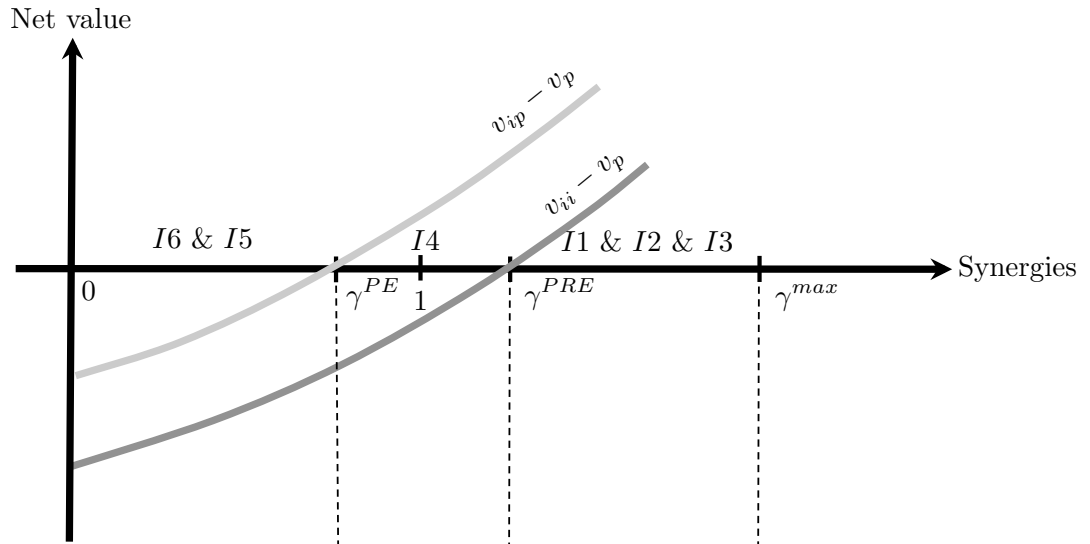
$$v_{ii} - v_p = [1 + r + \rho]^{-1}[\pi_A(i) - F_i - \pi_{NA}(i) + \rho A - \pi_p(p) + F_p + E]. \quad (12)$$

When the synergies are low $\gamma \in (0, \gamma^{PE})$, an MNE's valuation is lower than a PE-firm's. This is illustrated in Figure 2(i) where both the $v_{ip} - v_p$ and the $v_{ii} - v_p$ curve is below zero. Thus, without sufficient firm-specific synergies, an MNE acquisition is not profitable and instead a PE-firm will acquire the target firm (Figure 2(ii))

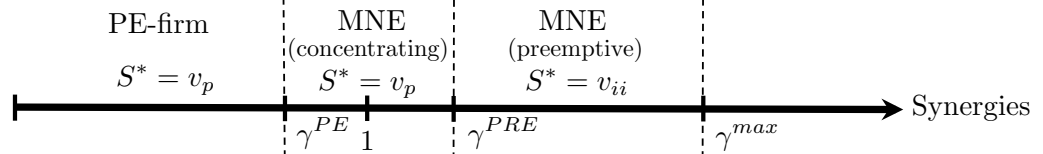
From Assumption 1, the valuation v_{ip} increases in synergies, γ . Indeed, the profit as an acquirer, $\pi_A(i)$, increases in γ :

$$\frac{d(v_{ip} - v_p)}{d\gamma} = (1 + r + \rho)^{-1} \frac{d\pi_A(i)}{d\gamma} > 0. \quad (13)$$

(i) The acquisition game



(ii) Equilibrium ownership



(iii) Equilibrium ownership

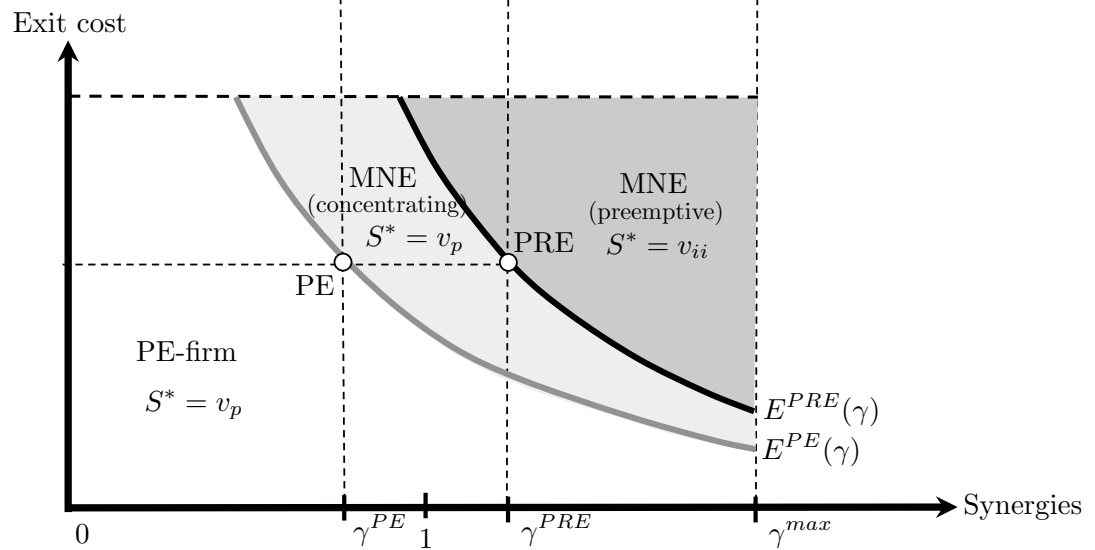


Figure 2: Illustrating equilibrium ownership as a function of synergies and exit costs

A further increase in synergies γ will thus make an MNE concentrating acquisition strictly profitable as $v_{ip} - v_p > 0$. The equilibrium sales price is then $S^* = v_p$. This is illustrated in Figure 2(ii), where MNE concentrating acquisitions occur in the region $\gamma \in [\gamma^{PE}, \gamma^{PRE})$.

Finally, we turn to the case of high levels of firm-specific synergies $\gamma \in (\gamma^{PRE}, \gamma^{\max})$. Using Assumption 1, we can note that the preemptive valuation of MNEs v_{ii} will increase more than the concentrating valuation v_{ip} since increasing synergies do not only increase the product market profit as an acquirer but also decrease the product market profit as a non-acquirer. Thus, the preemptive valuation v_{ii} is not only driven by the benefits of obtaining a strong position in the product market as an acquirer, but also by the preemptive motive for avoiding a weak position as a non-acquirer:

$$\frac{d(v_{ii} - v_p)}{d\gamma} = (1 + r + \rho)^{-1} \left[\frac{d\pi_A(i)}{d\gamma} - \frac{d\pi_{NA}(i)}{d\gamma} \right] > 0. \quad (14)$$

It then follows that a further increase in firm-specific synergies into the region $\gamma \in (\gamma^{PRE}, \gamma^{\max})$ will make a preemptive acquisition strictly profitable as $v_{ii} - v_p > 0$ (Figure 2(i)). A fierce bidding competition among MNEs then drives the equilibrium sales price to $S^* = v_{ii}$ (Figure 2(ii)).

4.2 Financial Market Development

Financial market development (as captured by E) is likely to favor PE-firms over MNEs in the competition for the target firm. PE-firms which own the target and its assets temporarily incur exit costs E when reselling the target firm. Financial market development in a country is important when reselling assets as PE-firms often list the target on a stock exchange or resell it to other incumbent firms. These resales are easier to undertake if financial markets are better developed. In contrast, this cost is not present for MNEs which are permanent owners of the target and its assets. We have the following proposition.

Proposition 2 *More developed financial markets (lower E) favor PE-firms over MNEs.*

To see how exit costs E affect equilibrium ownership, consider Figure 2(iii). This figure shows how equilibrium ownership is jointly determined by the synergies γ and the exit cost, E , faced by PE-firms. Let $E^{PE}(\gamma)$ be the *PE-condition* defined from $v_{ip} = v_p$, and let $E^{PRE}(\gamma)$ be the

preemption condition defined from $v_{ii} = v_p$. Solving for E in each equation we have:

$$E^{PE}(\gamma) = -\pi_A(i) + \pi_{NA}(p) + \pi_P(p) - \rho A - F_p + F_i, \text{ and} \quad (15)$$

$$E^{PRE}(\gamma) = -\pi_A(i) + \pi_{NA}(i) + \pi_P(p) - \rho A - F_p + F_i. \quad (16)$$

The loci associated with both the PE-condition $E^{PE}(\gamma)$ and the preemption condition $E^{PRE}(\gamma)$ are downward-sloping in the $\gamma - E$ space. Since the profit of the acquirer increases in γ , the profits of a non-acquirer $\pi_{NA}(l)$ are decreasing in γ , and a lower exit cost for the PE-firm is needed to balance the incumbent's higher value of obtaining the target.

Preemptive acquisitions occur to the right of the preemption locus $E^{PRE}(\gamma)$. Here, the exit costs and synergies for the MNEs are too high for PE-firms to compete. The high levels of synergies for the MNEs make the acquisition very attractive to them, which is why they compete with each other for the ownership of the target firm. Below this point for lower values of both E and γ , PE-firms can compete with MNEs for ownership of the target firm. Until we hit the $E^{PE}(\gamma)$ border, MNEs are winning the auction and performing entry deterring acquisitions between the PE-locus $E^{PE}(\gamma)$ and the preemption locus $E^{PRE}(\gamma)$. This is since for any given E , the synergies γ are still high enough (and likewise, for any given γ , E are still too high). Below the line $E^{PE}(\gamma)$, the combinations of the costs and synergies make it more profitable for the PE-firms to own the target firm, so we have PE-firm acquisitions to the left of the locus $E^{PE}(\gamma)$. Thus, it follows that for higher exit costs E , MNEs are more likely to end up acquiring the target firm.

4.3 Financial Market Conditions

Financial market conditions (r and ρ) vary over the business cycle and refer to firms' cost of acquiring outside funding for their projects and acquisitions. PE-firms are dependent on the availability of cash from outside investors to be able to make acquisitions. MNEs on the other hand, have retained earnings, A , which they can use to finance acquisitions. Thereby, financial market conditions will affect the two types of buyers differently. Our model provides the following predictions.

Proposition 3 *Financial market conditions affect equilibrium ownership as follows:*

(i) *Changes in the interest rate r do not affect who ends up buying the target, but it does affect the*

equilibrium acquisition price S^* .

(ii) A lower risk premium, ρ , makes an acquisition by a PE-firm more likely.

To see how r affects equilibrium ownership, note that both $E^{PE}(\gamma)$ and $E^{PRE}(\gamma)$ are independent of the interest rate r so r does not affect equilibrium ownership of the target firm. The acquisition price, however, is affected by r . To see this, note that

$$\frac{dS^*(i)}{dr} = \frac{dv_{ii}}{dr} = -(1+r+\rho)^{-2}[\pi_A(i) - F_i - \pi_{NA}(i)] < 0, \text{ and} \quad (17)$$

$$\frac{dS^*(p)}{dr} = \frac{dv_p}{dr} = -(1+r+\rho)^{-2}[\pi_P(p) - F_p - E] < 0. \quad (18)$$

The higher r is, the lower are the equilibrium acquisition prices. Intuitively, while MNEs have retained earnings A to use as payment in acquisitions, these retained earnings have an opportunity cost dictated by the same interest rate r that determines the cost of borrowing. Hence, having retained earnings does not lower the cost for an MNE to make the acquisition because the MNE accounts for the opportunity cost of using these funds. Perfect financial markets make an MNE indifferent between using retained earnings and financing the acquisition using outside financing. The equilibrium acquisition prices, however, do respond to financial market conditions since the more costly it is to obtain financing for an acquisition, the lower is the profitability of making the acquisition and, hence, the lower the valuations that MNEs and PE-firms put on the target.

Let us now turn to how the risk premium ρ affects equilibrium ownership. Inspecting $E^{PE}(\gamma)$ and $E^{PRE}(\gamma)$, it follows that both $E^{PE}(\gamma)$ and $E^{PRE}(\gamma)$ shift downwards as the relative value of the MNE's retained earnings used as payment in the acquisition increases (when ρ increases). With a higher risk premium ρ , MNEs gain an advantage over PE-firms that lack retained earnings that can be used to partly finance the acquisition. In effect, an MNE "saves" ρA by being able to use retained earnings instead of going to outside investors. This implies that MNEs are able to pay more for the target firm in a given acquisition making it more likely that an acquisition by an MNE takes place.

5 Welfare Effects of Restricting PE-Firms

To assess the welfare effects of restricting PE-firms for the domestic country, we will compare welfare for domestic consumers and the target firm in different market structures. These are (i) a non-discriminatory (*ND*) policy where both PE-firms and MNEs are allowed as owners, and (ii) a discriminatory (*D*) policy which prohibits PE-firms from buying domestic assets.

To this end, we let $PS(l)$ and $CS(l)$ denote the producer and consumer surpluses when the owner of the target firm is either the MNE ($l = i$) or the PE-firm ($l = p$). Welfare under ownership l will then be the sum of the producer (target) and consumer surpluses, that is

$$W(l) = PS(l) + CS(l) = S^*(l) + CS(l). \quad (19)$$

In each of the six potential equilibrium ownership outcomes in Table (1), we can investigate the difference between *ND* and *D* policies (denoted by subscripts).

I1($v_{ii} > v_{ip} > v_p$): MNEs compete against each other for ownership of the target. Restricting PE-firms from participating in the auction for the target neither affects equilibrium ownership nor the acquisition price. We have $W_{ND} = W_D = v_{ii} + CS(i)$.

I2($v_{ii} > v_p > v_{ip}$): There are two equilibria under the *ND* policy. There is one where MNEs compete with each other, and here PE-firms do not affect the outcome. There is also another equilibria where no bidding competition between MNEs occur since all MNEs coordinate on bidding below v_p . For this equilibrium a PE-firm may end up owning the target. Then, under the *D* policy, PE-firms would be restricted from taking over the target. As before, we focus on the equilibrium with an MNE as the acquirer. We have $W_{ND} = W_D = v_{ii} + CS(i)$.

I3($v_{ip} > v_{ii} > v_p$): Here v_p is too low for the MNEs to respond by bidding up the price to v_{ip} . Competition is again between MNEs. The absence of PE-firms in the auction under a *D* policy has no effect on the outcome. We have $W_{ND} = W_D = v_{ii} + CS(i)$.

I4($v_{ip} > v_p > v_{ii}$): The PE-firm acts as an active threat in the auction as its valuation has an edge over v_{ii} . This is since the MNE's valuation of the firm when the alternative buyer is a PE-firm, v_{ip} , is the highest valuation and the sales price S^* under MNE ownership goes

up from v_{ii} to a strictly higher v_p under the ND policy. Under the D policy, the threat of a PE-firm taking over the target is missing, and so the sales price remains at v_{ii} . We have $W_{ND} = v_p + CS(i)$ and $W_D = v_{ii} + CS(i)$.

I5($v_p > v_{ii} > v_{ip}$): Under the ND policy, the target is acquired by a PE-firm at price $S^* = v_p$ as opposed to by an MNE at price $S^* = v_{ii}$ under the D policy. We have $W_{ND} = v_p + CS(p)$ and $W_D = v_{ii} + CS(i)$.

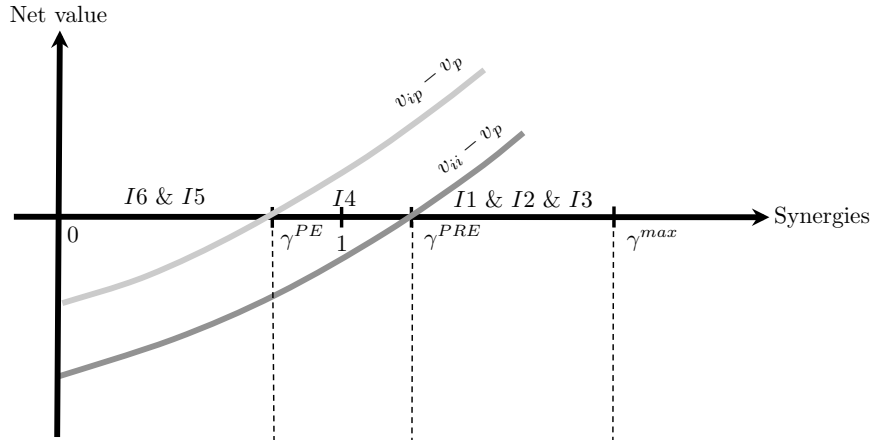
I6($v_p > v_{ip} > v_{ii}$): Once more, the ND policy allows for a PE-firm to acquire the target instead of an MNE at a price of v_p rather than v_{ii} . We have $W_{ND} = v_p + CS(p)$ and $W_D = v_{ii} + CS(i)$.

Thus, depending on the rankings of the valuations, the D policy will have different effects. The domestic target firm gets the same sales price $S^* = v_{ii}$ for Inequalities $I1 - I3$ under both policies, but under $I4 - I6$ the target firm gets a lower sales price of v_{ii} instead of v_p . Consumer surplus depends on two components: the number of firms that service the market (n or $n + 1$) and the synergies between the owners and the target firm (γ). Both of these will affect product market prices on the domestic market. Under $I1-I4$ with an MNE acquisition, there are fewer firms serving the market since the target is acquired by the MNE (we go from $n + 1$ to n firms in the market). This reduces consumer surplus. However, the owner will operate the target with synergies equal to γ which, for high values, can overturn the negative effect on consumer surplus from fewer firms operating in the market. Note, however, that the D policy does not affect the outcome, so in the comparison between the ND and the D policies, consumer surplus remains unchanged for $I1 - I4$. In sum, we have:

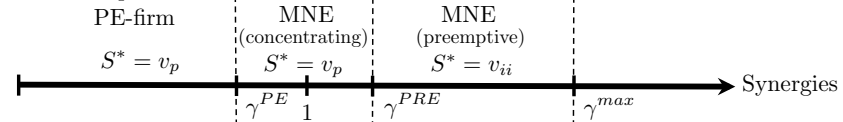
$$W_{ND} - W_D = \begin{cases} CS(p) - CS(i) + v_p - v_{ii} & \text{for } I5 - I6. \\ v_p - v_{ii} & \text{for } I4. \\ 0 & \text{for } I1 - I3. \end{cases} \quad (20)$$

Figure 3 illustrates this outcome graphically. Note first that Figure 3(i) shows that concentrating MNE acquisitions can occur for synergies below unity, i.e. where γ is above the threshold γ^{PE} but below one. Welfare inefficient MNE acquisitions, compared to acquisitions by PE-firms, can therefore lead to decreased consumer prices for two reasons. First, productivity in the MNE

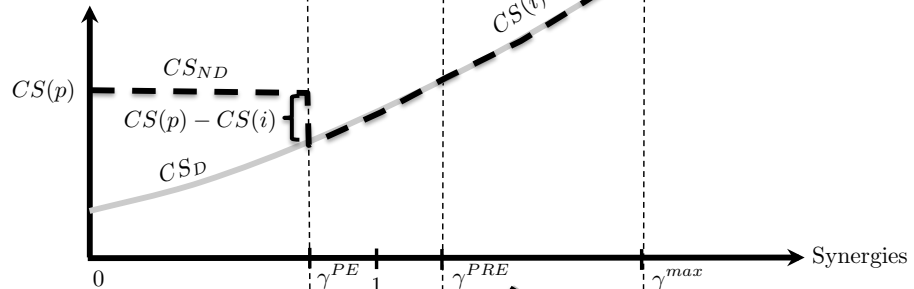
(i) The acquisition game



(ii) Equilibrium ownership



(iii) Consumer surplus



(iv) Total surplus

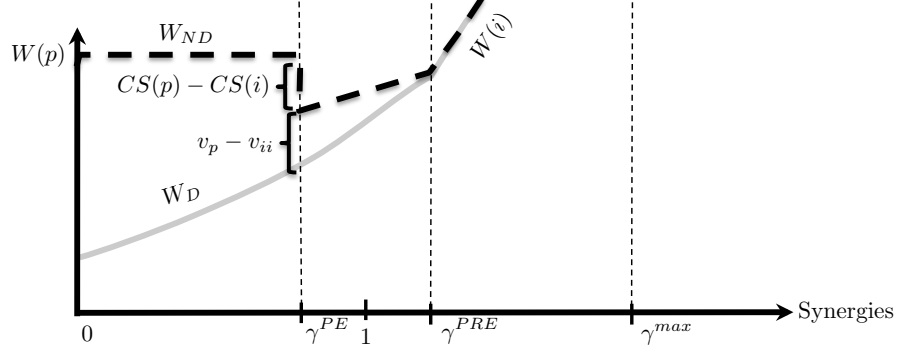


Figure 3: Illustrating changes in consumer and total surplus

acquired firm is lower than after an acquisition by a PE-firm which will lead to an increase in equilibrium consumer prices. Second, an MNE acquisition leads to a market concentration compared to an acquisition by a PE-firm (n firms instead of $n + 1$ firms). This induces an additional decrease in the consumer surplus. The aggregate effect is illustrated in Figure 3(iii) as a discrete change downwards by $CS(p) - CS(i)$ in the consumer surplus at γ^{PE} . Figure 3(iv) illustrates the effect on total surplus by accounting for the change in producer surplus as well. For regions $I4 - I6$, producer surplus is reduced by $v_p - v_{ii}$. This leads to an additional discrete drop in total surplus equal to $v_p - v_{ii}$ at γ^{PE} . Note that for $I1 - I3$ the W_D and W_{ND} curves run in parallel. We thus have the following proposition:

Proposition 4 *Restricting PE-firms from bidding for domestic targets can decrease consumer and total surplus when synergies between the MNEs and the target's assets (γ) are sufficiently low.*

Thus, acquisitions by PE-firms can be welfare improving both because PE-firms could be more efficient than foreign MNEs at running the target firm, and because an acquisition by a PE-firm prevents a concentration of the market. Hence, a policy of restricting foreign PE-firms from acquiring domestic targets could be counterproductive.

6 Extensions

6.1 Different Risk Premia

As stated above, the risk premia account for the credit risks that could be different for the two types of borrowers (MNEs and PE-firms). Thus, we could formulate the difference in rates between PEs and MNEs as banks charge the same underlying rates to both types of borrowers, but denote the risk premia associated with MNEs as ρ_{MNE} and the risk premia associated with PE as ρ_{PE} . We then get

$$\begin{aligned}
 N_{il}(S) = & \underbrace{[\pi_A(i) - F_i - S] + [(S - A) - (1 + r + \rho_{MNE})(S - A)] + A}_{\text{Acquire}} \\
 & - \underbrace{[\pi_{NA}(l) + (1 + r)A]}_{\text{Do not acquire}} = 0
 \end{aligned} \tag{21}$$

for $l \in \{i, p\}$. To see how equations $E^{PE}(\gamma)$ and $E^{PRE}(\gamma)$ would then be updated to reflect the differences we first calculate the different valuations in this setting to evaluate $E^{PE}(\gamma)$:

$$v_{ip} = [1 + r + \rho_{MNE}]^{-1}[\pi_A(i) - F_i - \pi_{NA}(p) + \rho_{MNE}A]. \quad (22)$$

The valuation for the PE-firm then takes the value:

$$v_p = [1 + r + \rho_{PE}]^{-1}[\pi_p(p) - F_p - E]. \quad (23)$$

The expression for $E^{PE}(\gamma)$ would then become:

$$E^{PE}(\gamma) = -E = \frac{[\pi_A(i) - F_i - \pi_{NA}(p) + \rho_{MNE}A][1 + r + \rho_{PE}]}{[1 + r + \rho_{MNE}]} - [\pi_p(p) - F_p]. \quad (24)$$

Let us consider the situation where we move from a setting where the premia are equal to the case of $\rho_{PE} > \rho_{MNE}$. We have

$$\frac{\partial E^{PE}(\gamma)}{\partial \rho_{PE}} = \frac{[\pi_A(i) - F_i - \pi_{NA}(p) + \rho_{MNE}A]}{[1 + r + \rho_{MNE}]} > 0. \quad (25)$$

Thus, if we allow for different risk premia for different types of buyers in a setting where $\rho_{PE} > \rho_{MNE}$, we will have the $E^{PE}(\gamma)$ curve shift down, thus, decreasing the combinations of γ and E that correspond to an acquisition made by a PE-firm. This implies that MNEs gain an advantage over PE-firms compared to in the setting where risk premia are equal.

7 Concluding Remarks

The globalization process implies that new business models spread wider and faster over the world than ever before. More than 8 percent of all cross-border acquisitions that took place during 1998-2010 were cross-border acquisitions undertaken by PE-firms. And there was substantial variation over time, across countries and across sectors in the share of cross-border acquisitions that were acquisitions by PE-firms as opposed to those by MNEs.

In this paper we have developed a formal model of competition for domestic assets between MNEs and PE-firms to better understand possible causes for this variation. In our model, MNE

advantage lies in firm-specific synergies and retained earnings, whereas PE-firms are good at reorganizing target firms. We showed that prevailing interest rates do not work in favor of PE-firms, but that lower risk premia and better financial market developments do. Stronger firm-specific synergies, however, favor MNEs. Performing a welfare analysis, we show that a policy of restricting PE-firms from buying domestic assets can be counterproductive.

While it is well established that cross-border mergers and acquisitions play a key role in the global industrial development and restructuring process, our model is, to the best of our knowledge, the first to incorporate PE-firms that compete with MNEs for domestic firms that are up for sale. As such, we identify an important role of the PE-firms as challengers of existing international oligopolies. These results suggest that policies improving the international market for corporate control would be preferred to policies restricting cross-border acquisitions by PE-firms.

In the analysis, we have assumed that the PE-firm exits its investment by means of listing the firm on a stock exchange or through a sale to an outside investor. However, a substantial share of all exits by PE-firms are exits through trade sales to incumbents. In that setting, while the main results of the paper will still be valid, an acquisition by a PE-firm will from a welfare point of view not restore the intensity of competition in the product market in the long run. However, as shown by Norbäck, Persson and Tåg (2013), exits by trade sales to incumbents lead to incentives to invest more in restructuring to enhance bidding competitions for target firms in the exit stages. This tends to benefit consumers but can hurt producers.

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A Appendix

A.1 Proof of Lemma 1

First, $b_i \geq \max\{v_p, v_{ii}, v_{ip}\}$ is a weakly dominated strategy. No owner wants to post a bid above its valuation of obtaining the assets, and the assets will always be sold.

Inequality I1 ($v_{ii} > v_{ip} > v_p$): Since $v_{ip} > v_p$, an MNE will always have an incentive to outbid PE-firms. The MNEs will then bid up the price to v_{ii} to prevent a rival from obtaining the assets. An MNE will obtain the assets.

Inequality I2 ($v_{ii} > v_p > v_{ip}$): Since $v_p > v_{ip}$, the outcome depends on what an MNE believes will happen if it does not win. If it believes that another MNE will win, MNEs will then bid up the price to v_{ii} and an MNE will obtain the assets. If it believes that a PE-firm will win, then since $v_p > v_{ip}$, the PE-firms will bid up the price to v_p and an MNE will obtain the assets.

Inequality I3 ($v_{ip} > v_{ii} > v_p$): Since $v_{ip} > v_p$, an MNE will always have an incentive to outbid PE-firms. The MNEs will then bid up the price to v_{ii} to prevent a rival from obtaining the assets. An MNE will obtain the assets. Since MNEs realize that a PE-firm will never obtain the assets ($v_{ip} > v_p$), the price will not be bid up to v_{ip} .

Inequality I4 ($v_{ip} > v_p > v_{ii}$): Since $v_{ip} > v_p$, an MNE will always have an incentive to outbid PE-firms and bid up the price to slightly above v_p . However, only one MNE has this incentive, since no other MNE wants to outbid him or her ($v_p > v_{ii}$). An MNE will then obtain the assets at price v_p .

Inequality I5 ($v_p > v_{ii} > v_{ip}$): Since $v_p > v_{ip}$, no MNEs will want to outbid the PE-firms. The PE-firms will then bid up the price to v_p and a PE-firm will obtain the assets.

Inequality I6 ($v_p > v_{ip} > v_{ii}$): Since $v_p > v_{ip}$, no MNEs will want to outbid the PE-firms. The PE-firms will then bid up the price to v_p and a PE-firm will obtain the assets.